TC1508 L298N Mini 2 Channel DC motor driver module forward and reverse PWM speed regulation double H -bridge for Arduino

Introduction:

The TC1508 L298N mini 2-channel DC motor driver module is a compact module used to control two DC motors. It's based on the L298N dual H-bridge motor driver IC, allowing it to drive motors with voltages up to 35V and currents up to 2A per channel. The module typically has input pins for controlling motor direction and speed, making it suitable for various robotic and motor control applications.

Features:

- Dual H-bridge motor driver based on the L298N IC.
- Supports driving two DC motors simultaneously.
- Input voltage range: 5V to 35V.
- Output current per channel: Up to 2A.
- Control interface: Typically uses digital inputs for controlling motor direction and PWM (pulse-width modulation) for speed control.
- Compact size for easy integration into projects.
- Built-in fly back diodes for motor protection.
- Screw terminals for easy motor and power connections.

Specs:

- Input Voltage: 5V to 35V
- Output Current: Up to 2A per channel
- Logic Voltage: 5V
- Drive Mode: Dual H-bridge driver (forward, reverse, brake)
- Dimensions: Varies depending on the specific module, but typically compact in size for easy integration into projects.
- Operating Temperature: -25°C to +130°C
- Protection: Built-in fly back diodes for motor protection against reverse voltage spikes.

- Control Interface: Typically uses digital inputs for motor direction control and PWM for speed control.

Objective:

The objective of the TC1508 L298N mini 2-channel DC motor driver module is to provide a compact and versatile solution for controlling two DC motors in various electronic projects and applications. By integrating the L298N dual H-bridge motor driver IC into a mini module, the product aims to offer ease of use, flexibility, and reliability in driving DC motors with voltages up to 35V and currents up to 2A per channel. Its features and specifications cater to the needs of hobbyists, DIY enthusiasts, students, and professionals working on robotics, automation, motorized vehicles, and other electromechanical projects where precise motor control is required. Ultimately, the objective is to enable users to efficiently control DC motors in their projects without having to design complex motor driver circuits from scratch.

Components Needed:

1) Arduino Uno Board and USB
2) DC Motor
3) MX1508 L298N Mini 2-Channel DC motor drive module forward and reverse PWM speed regulation double H –bridge
4) Jumper wires
5) Adapter 5V/2A charger

Procedures:

Step 1: Hardware Installation
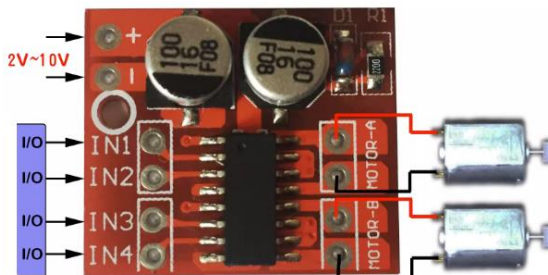
1) MX1508 L298N Mini 2-Channel DC motor drive module forward and reverse PWM speed regulation double H –bridge to Arduino Uno
   - + to VIN
   - - to GND
   - IN1 to PIN 7 (OR you can change to any digital pin available on your UNO)
   - IN2 to PIN 6 (OR you can change to any digital pin available on your UNO)
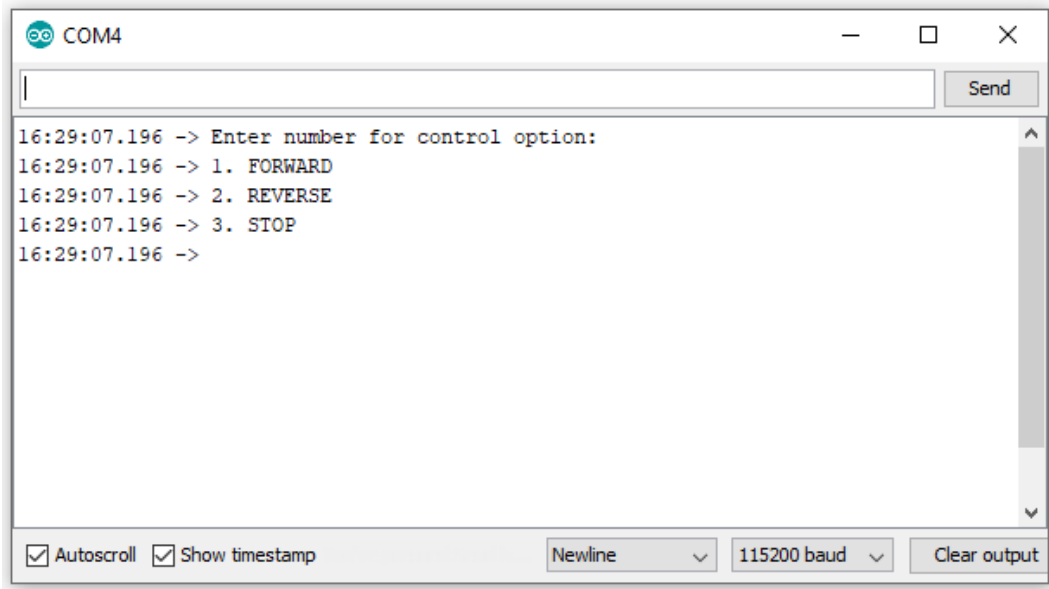
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2) Connect your DC Motor to pinout Motor A (refer picture for help).
3) Connect your adapter 5V/2A charger to Arduino Uno Board.
4) Connect your Arduino Uno Board to your computer using USB cables.

Step 2: Sample source code

```
1
2  int IN1 = 12;
3  int IN2 = 11;
4  int IN3 = 7;
5  int IN4 = 6;
6
7  void setup()
8  {
9    pinMode(IN1, OUTPUT);
10   pinMode(IN2, OUTPUT);
11   pinMode(IN3, OUTPUT);
12   pinMode(IN4, OUTPUT);
13
14   Serial.begin(115200);
15   Serial.println("Enter number for control option:");
16   Serial.println("1. FORWARD");
17   Serial.println("2. REVERSE");
18   Serial.println("3. STOP");
19   Serial.println();
20 }
21
22 void loop()
23 {
24   char user_input;
25
26   while(Serial.available())
27   {
28     user_input = Serial.read();
29     digitalWrite(IN1, LOW); //OFF
30     digitalWrite(IN2, LOW);
31
32     if (user_input =='1')
33     {
34        Forward();
35     }
36     else if(user_input =='2')
37     {
38       Reverse();
39     }
40     else if(user_input =='3')
41     {
42       Stop();
43     }
44
45
46   }
47 }
48
49
50 void Forward()
51 {
52   digitalWrite(IN1, HIGH);
53   digitalWrite(IN2, LOW);
54   Serial.print("Motor 1 Forward");
55   Serial.println();
56
57   digitalWrite(IN3, HIGH);
58   digitalWrite(IN4, LOW);
59   Serial.println("Motor 2 Forward");
60   Serial.println();
61 }
62
63 void Reverse()
64 {
65   digitalWrite(IN1, LOW);
66   digitalWrite(IN2, HIGH);
67   Serial.print("Motor 2 Reverse");
68   Serial.println();
69
70   digitalWrite(IN3, LOW);
71   digitalWrite(IN4, HIGH);
72   Serial.println("Motor 2 Reverse");
73   Serial.println();
74 }
75
76 void Stop()
77 {
78   digitalWrite(IN1, LOW);
79   digitalWrite(IN2, LOW);
80   Serial.print("Motor 1 Stop");
81   Serial.println();
82
83   digitalWrite(IN3, LOW);
84   digitalWrite(IN4, LOW);
85   Serial.println("Motor 2 Stop");
86   Serial.println();
87
88 }
```
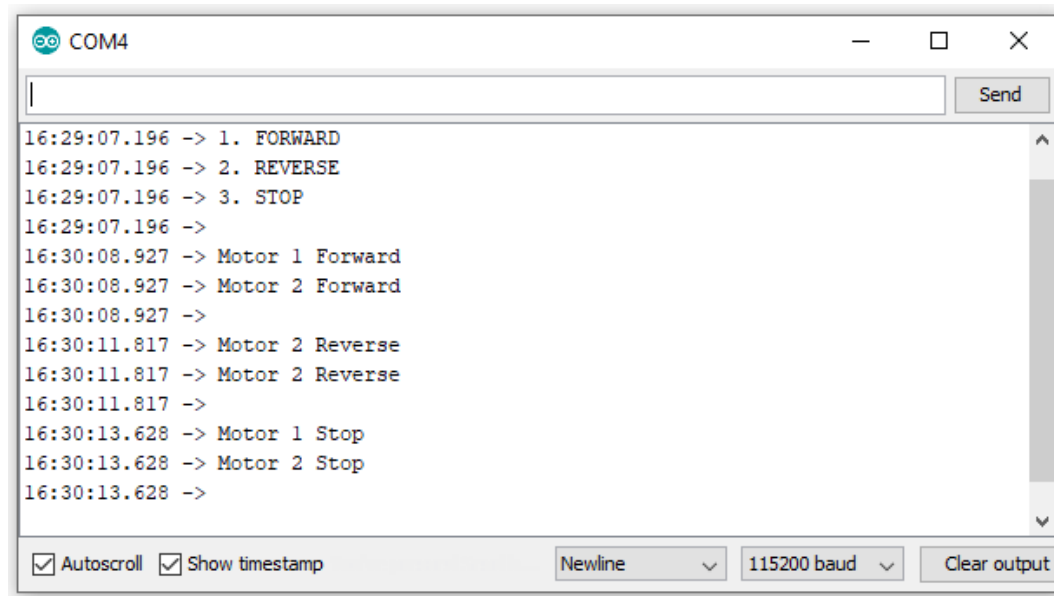
1) This is a sample source code for the circuit.
2) Make sure to go to tools > Port & Board.
3) Select the correct board (Arduino/Genuino Uno) and port (refer to your own port COM#) before uploading the code.

Step 3: Serial monitor

```
COM4                                                    —    □    ✕
|                                                            Send

16:29:07.196 -> Enter number for control option:
16:29:07.196 -> 1. FORWARD
16:29:07.196 -> 2. REVERSE
16:29:07.196 -> 3. STOP
16:29:07.196 ->




☑ Autoscroll  ☑ Show timestamp      Newline  ∨  115200 baud  ∨   Clear output
```

1) Go to tools > Serial Monitor and you will see as shown in the picture above printed on your serial monitor.
2) Key-in number option (1, 2 or 3) to start the operation.

Step 4: Result

```
COM4                                                    —    □    ✕
|                                                            Send

16:29:07.196 -> 1. FORWARD
16:29:07.196 -> 2. REVERSE
16:29:07.196 -> 3. STOP
16:29:07.196 ->
16:30:08.927 -> Motor 1 Forward
16:30:08.927 -> Motor 2 Forward
16:30:08.927 ->
16:30:11.817 -> Motor 2 Reverse
16:30:11.817 -> Motor 2 Reverse
16:30:11.817 ->
16:30:13.628 -> Motor 1 Stop
16:30:13.628 -> Motor 2 Stop
16:30:13.628 ->

☑ Autoscroll  ☑ Show timestamp      Newline  ∨  115200 baud  ∨   Clear output
```

1) When user enter number '1', both dc motor start to rotate forward and serial monitor will print will print "Motor 1 forward, Motor 2 forward".
2) When user enter number '2', both dc motor start to rotate reverse and serial monitor will print will print "Motor 1 reverse, Motor 2 reverse".

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3) When user enter number '3', both dc motor stop from rotating and serial monitor will print "Motor 1 stop, Motor 2 stop".

Conclusion:

In conclusion, the TC1508 L298N Mini 2 Channel DC Motor Driver Module represents a versatile and efficient solution for controlling DC motors with Arduino projects. Its compact design and dual H-bridge configuration enable precise forward and reverse motor control, while the PWM speed regulation adds flexibility for varied applications. This module's compatibility with Arduino makes it accessible for both beginners and experienced enthusiasts, offering a convenient way to power and control DC motors in robotics, automation, or other electronic projects. With its ability to handle higher currents and the inclusion of protective features, such as overcurrent and overheat protection, the TC1508 L298N module provides a reliable and user-friendly platform for motor control. It proves particularly useful in scenarios requiring bidirectional motor control and speed adjustments, contributing to the versatility and effectiveness of Arduino-based projects involving DC motors.